DOE Leads Synfuels Crusade Without a Map

The bureaucracy may commit $5 billion before the synfuels corporation even opens its doors

Like the Apollo program that put a man on the moon in 10 years, the Administration's synthethic fuels program has a large bank account and a lot of hard technological deadlines to meet. Unlike that program, it has no precisely mapped goal.

Because there are so many promising avenues to explore, the managers of the effort to "commercialize" this industry are taking an ecumenical approach: every avenue will be explored. In doing this, the federal bureaucracy is acting on the express wishes of Congress.

The chief weakness in the synfuels program at the moment is that it lacks a director, although this has not prevented it from spending money. The President signed the act creating the Synthetic Fuels Corporation (SFC) on 30 June, but he has not yet nominated a chairman or any of the members of the seven-person directorate. Congress has appropriated a large first installment for alternative fuels and the SFC—$19 billion—and it has already given the Department of Energy (DOE) permission to spend or commit $5 billion of the total in the SFC's account. Congress did not want to have the money sit unspent while the SFC was aborning, so it ordered the civil servants at DOE to start writing checks. It is hard to imagine how the SFC will be truly insulated from pressure politics, as has been promised; yet it is easy to imagine the corporation being less pressured than DOE. At the moment, the DOE is unrivaled among federal agencies in the amount of political voltage running through its corridors. While the SFC is being organized, the DOE Assistant Secretary for Resource Applications—Ruth Davis—will oversee the synfuels subsidy program following Congress's instructions.

As the lead agency DOE manages a confusing abundance of synfuels money. In addition to its temporary stewardship over the SFC account, the DOE has been given authority (with the Department of Agriculture) over $1.2 billion appropriated for helping nascent industries producing fuel from crops, wood, and urban waste. It has also been given $500 million this year to finance feasibility studies and some design work by companies which will presumably come back later for massive loan guarantees.

The reason President Carter has not been able to recruit leaders for the SFC, according to former DOE Under Secretary John O'Leary, is that the desirable candidates are turning out to be Reagan supporters. What the SFC needs, he says, are members with a lot of experience in the energy industry, great financial savvy, and a willingness to leave a successful career in the private sector for an uncertain one in government. Retiring executives of big corporations fit the profile, but they also tend to be political conservatives. It is proving extraordinarily difficult to sign someone up before the election.

A White House staffer working on the SFC says "we are ready to go" as soon as a chief is named. Option papers have been drawn up suggesting alternate ways of structuring and running the agency. But nothing of substance will be drafted until the board is named, for only the members have the authority to make policy. The SFC has no policy now other than to plan—sometime—to aid commercial ventures proposing to produce fuels from coal, oil shale, and tar sands. There are a few other fuel categories. However, wood, biomass, and other renewable sources of energy are specifically excluded from the SFC's jurisdiction.

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The interim managers of the program at DOE have adopted a broad plan of attack. Spokesman Fred Appel said that Assistant Secretary Davis would not be able to discuss the program "for weeks," because of the burdens imposed by the congressional order to begin spending funds now. As for the purpose of the program, he said Davis could give no more specific an explanation than could he. "There is no strategy, no particular emphasis," he said. "We will let the private sector tell us what to build. Our single objective is to develop as much commercial capacity to produce synthetic fuels as rapidly as we can." Private companies propose; DOE disposes. Any scheme that will produce synthetic fuel and is commercially viable and technically feasible is a candidate for DOE support.

Ruth Davis

A commercial project is simply one conceived by private investors and designed to make a profit. That definition and the feasibility requirement act as a limit on fantasy in these proposals. The limit at the mundane extreme is the definition of synthetic fuel, which is intended to distinguish these schemes from ordinary energy production.

It should come as no surprise that Congress has pressured the DOE to define synthetics as broadly as possible. This has already created some confusion. Consider the cases of unconventional gas and heavy oil. These two naturally occurring fuels are becoming profitable to mine and process in today's high-priced energy market. Nevertheless, both are considered "alternative

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fuels" and eligible for special aid under the interim program. A DOE expert in this area said that normally the agency uses a four-part definition for unconventional gas, but for the synfuels effort the definition has been "broadened to include almost anything." He said, "No holds have been barred." The DOE staff will entertain nearly any definition used by the proposers.

Heavy oil, the term used for viscous and hard-to-produce crude, was not included as an alternative fuel in the bill authorizing the spending. But now, as an afterthought, some of the congressional sponsors—Senate Majority Leader Robert Byrd (D-W.Va.), and Representatives Sidney Yates (D-Ill.), and Joseph McDade (R-Pa.)—have instructed the DOE to entertain heavy oil proposals from industry. DOE has complied, adding a footnote to its solicitation notices saying that Congress hopes to enact legislation in time to make it all legal. A DOE technician said Congress will surely assign him the dreaded task of defining what heavy oil is.

The synfuels commercialization program may continue to live in limbo, a DOE official said, through the election or later. It may take a year to get the SFC running, and during the interim the department will continue to make funding awards. The corporation, once it is ready, will sponsor only those projects which it finds meritorious. It will have to build a wall between its turf and DOE's.

DOE's effort is known as the "alternative fuels program" because it covers a variety of projects, most notably alcohol distilling, not included in the SFC's domain. As of this writing, the DOE has committed $450 million of the several billion dollars available. The first loan guarantee, amounting to $250 million, was given out with pomp and ceremony at the White House last July. It was awarded to the Great Plains Gasification Associates to finance the first year of construction of a coal-to-gas plant in western North Dakota. The total cost will be about $1.5 billion. The objective: to produce the gas equivalent of about 20,000 barrels of oil a day, starting in 1984 or 1985. There is nothing revolutionary in the technology. It has been used in South Africa for decades, but never profitably in the United States. The sponsors have been trying for years to launch the project, but were impeded by what they claimed was an unreasonable federal restriction on the price utilities could charge for the gas. The government has now offered a waiver of that restriction. But at least one large consumer has threatened to sue if the price restriction is waived. In this regulatory and financial tangle, it is hard to discern just what the market will support. But the plant will be built.

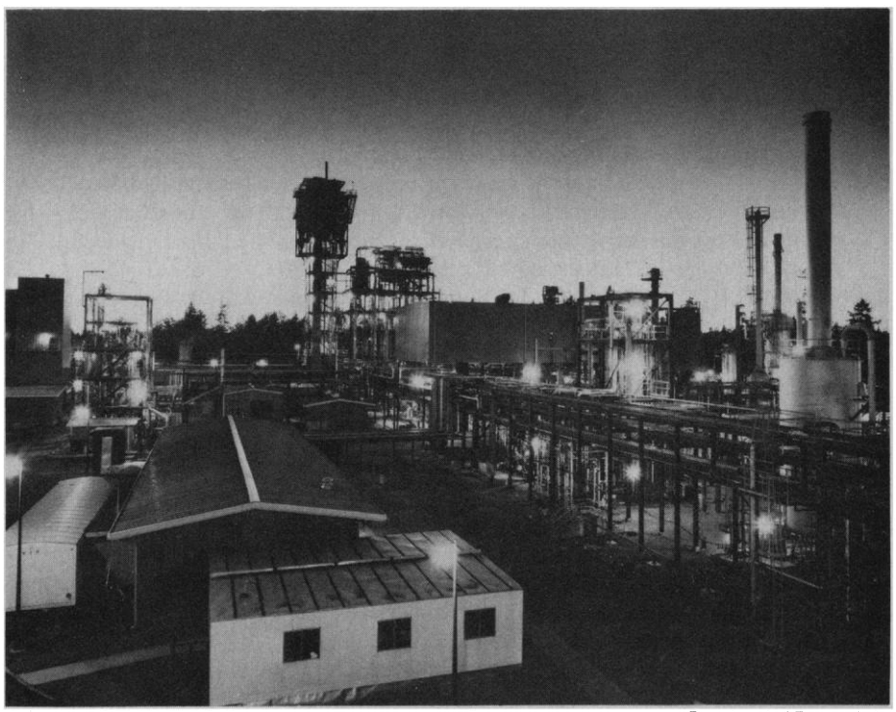
Of the remaining $200 million spent by DOE, half has been given to groups proposing to make expensive feasibility studies, and half to companies actually ready to start work on commercial energy plants. The bill appropriating funds for the program gave DOE 90 days to solicit proposals. DOE not only met the deadline but also chose the winners in record time. People were pulled from their regular jobs to review proposals on a crash basis. Congress seems pleased with the results.

By good fortune, a DOE official said, the best proposals fell into an even geographic distribution. Out of 971 applicants, 99 were awarded funds for feasibility studies and 11 were made partners with the government in cooperative ventures. Only four states won nothing: Connecticut, Delaware, New Hampshire, and Rhode Island. Nearly every place had something synthetic to offer. Vermont came through, for example, winning $95,700 for a feasibility study for a plant that would produce ethanol from cheese whey, contributing the equivalent of 92 barrels of oil a day.

Congress liked DOE's performance so well, an agency official said, that it asked DOE to do the same thing all over again but this time with more money—$300 million. Congress made that sum available for DOE's repeat performance in a supplemental appropriation passed in July. Grant seekers must have their proposals in DOE's hands by the end of September. In addition, DOE plans to solicit bids in September for the $5 billion Congress has made available for loan guarantees, price guarantees, and purchase agreements. This is being done on behalf of the SFC, which may find when it comes into being that one-quarter of its starting funds have already been committed.

Some have criticized the program for what they see as unwarranted emphasis on alcohol production. (Forty-two of the 99 feasibility studies and 2 of the 11 cooperative agreements are for alcohol.) "It's absolute foolishness," said an oil company synfuels specialist who did not want to be identified because, "anybody who says anything against alcohol or gasohol today is going against God, mother, and country." He calculated that the tax subsidies for gasohol—not counting the synfuels program support—already amount to between $30 and $60 per barrel of alcohol. And alcohol, by volume, contains only about two-thirds the energy value of gasoline. Liquids from coal, he said, are far more competitive economically.

One of the virtues of alcohol is that it can be produced almost anywhere. Just as Vermont offers cheese whey as an energy source, Maine offers potatoes; Texas, rice hulls; Hawaii, molasses; Iowa,



Department of Energy photo

DOE's prototype synfuels plant at Fort Lewis, Washington, can liquefy up to 50 tons of coal a day.

Carter Plan: Dividend for R & D

Since it is political open season, President Carter's economic revitalization message will inevitably be read as a campaign document as well as a policy blueprint. The more because Carter's proposals concentrate on tax measures which, in an election year, tend to inspire skepticism.

In his message on 28 August, Carter continued to stress the importance of increased productivity in breaking the grip of an inflationary recession. To foster technological innovation, he proposed adding $600 million over the next 2 years to federal support of R & D, much of it to underwrite basic research. But on the innovation front he seems to be counting mainly on the "Industrial Innovation Initiatives" that he proposed last October.

Those initiatives were the product of a year-and-a-half-long domestic policy review (DPR) (*Science*, 27 July 1979) designed to tell the President what the federal government could best do to encourage innovation. Industry representatives involved in the exercise urged the government to reduce disincentives to innovation imposed by regulatory, patent, antitrust, and tax laws. They gave top priority to reforming the tax structure to encourage investment rather than consumption.

Carter's bid in his new program for a major acceleration of tax depreciation allowances, therefore, is welcomed by industry spokesmen who see faster depreciation as encouraging investment in new plant and technology with consequent improvement in processes, products, and productivity.

Another tax measure, a proposal to provide an investment tax credit, which under certain circumstances would be refundable, has been met with less enthusiasm. The tax credit is intended to encourage investment by firms which are not profitable enough to pay taxes. It is thought that it will be especially helpful to new, highly innovative firms. Opposition to refundable tax credits, however, is formidable, particularly from those who regard them as subsidies.

The major news for the research community is the promise of $600 million in added budget authority for fiscal years (FY) 1981 and 1982. Part of the money would be used to maintain Carter's commitment to a 3 percent growth, in real terms, in support of basic research in each of the next 2 years. Basic research funding this year should total about $4.5 billion. Money to upgrade university science and engineering facilities would also be forthcoming.

Other initiatives are promised. Presidential science adviser Frank Press says that the program particulars will be included in the FY 1982 budget in January and that in coming months the Administration will consult with scientists and engineers in universities and industry on the details.

Press indicated that the Administration will put more emphasis on programs to promote collaboration in research involving government, universities, and industry and on measures to promote "generic" research to benefit whole industries. Legislation authorizing the creation of industrial technology centers for such generic research has been passed by the Senate and reported out by the House committee with jurisdiction.

Regarding other ideas from the domestic policy review there is progress, if slow. Patent law reform is in the works and help for the beleaguered Patent Office seems to be on the way. The Justice Department, after many drafts is expected soon to issue a guide to help companies that want to cooperate on research find their way through the antitrust law maze.

Much of the success of the Carter program will depend on the Administration's ability to convince Congress to accept the necessity of long-term solutions to the nation's economic difficulties. The uncertainty of the Administration's own long-term prospects is a complication.

Politically, the new program could pay off for Carter if the voters believe that it provides a foundation for economic growth with reduced inflation. Economically, it represents a shift from short-term, Keynesian countercyclical measures to steer the economy. Ideologically, it is an attempt to change the industrial climate by sending a message to the private sector saying that the government is serious about quelling the adversarial quality that has chilled its relations with industry.—J.W.

corn. DOE has a couple of reasons for sponsoring these projects. One is that Congress has told it to do so. Feasibility studies must be undertaken so that DOE and the Department of Agriculture may sensibly spend the $1.2 billion they have been given to support energy production from biomass and urban waste. Another reason is that the technology for making alcohol is easily available and, with current subsidies, commercially viable.

DOE officials point out that less of the money spent this summer has gone to ethanol projects (25 percent) than to coal gasification or liquefaction (35 percent). Among the big joint ventures sponsored by DOE were five coal projects, one of them designed to produce liquids. The last is of particular interest, since the crisis that inspired the entire synfuels effort was a shortage of liquid fuel (gasoline).

The Texas Eastern company, with the help of a $24 million start-up loan from DOE, proposes to build a duplicate of South Africa's SASOL II coal liquefaction plant. The total cost of the project in 1979 dollars will be about $3.5 billion. It will produce the equivalent of 50,000 barrels of oil a day, half as gas and half as liquid. The most optimistic estimate is that the plant will be operational in 6 years.

Another arm of DOE, the research and development branch of the fossil energy program, is investing on its own in a variety of coal liquefaction technologies, none of which is close to being commercially viable. The most ambitious of these projects is known as Solvent Refined Coal II (SRC-II). It uses a process developed by a subdivision of Gulf Oil, one which is far more efficient than SASOL's. The system has been tested successfully in a pilot plant at Fort Lewis, Washington, for 6 years, and now the DOE hopes it will prove itself in a large demonstration plant, producing the equivalent of about 20,000 barrels of oil a day. West Germany and Japan have joined Gulf and the DOE in financing the plant, which should be fully operational after 1985. It is designed to be the first of five duplicate segments that will become a huge profitmaking plant in the 1990's. This is only one of many synfuels projects DOE has nurtured over the years.

How will the SFC choose winners from the army of competitors lured into the race? That remains to be seen. It is plain, however, that when the new board of directors arrives in Washington, it will be greeted by a large constituency in industry and the bureaucracy with definite ideas of how to proceed.

—ELIOT MARSHALL

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